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(54) Snowboard adjustable binding

(57) A snowboard adjustable binding having a disk (10) connected to a supporting base (2) for a shoe. The supporting base can be rotated and locked relative to the disk. This adjustment can be performed easily, quickly and safely by the user even while the shoe is connected to the binding.

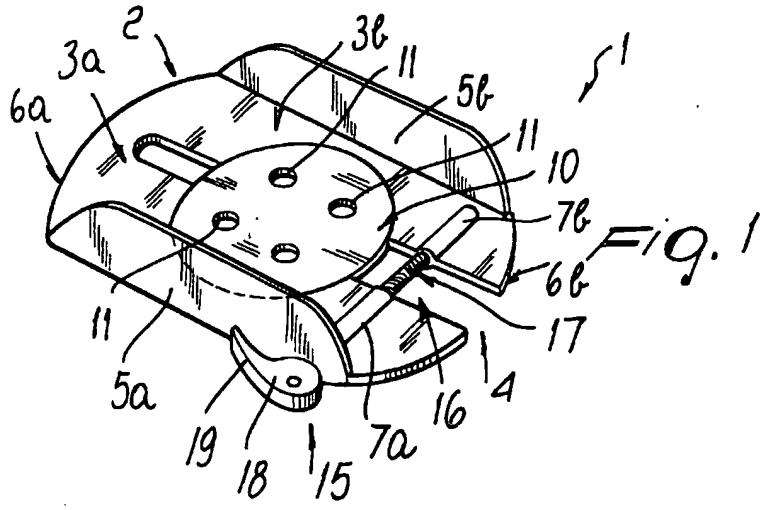

Fig. 1

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Description

The present invention relates to a snowboard adjustable binding.

Snowboarding is characterized by various techniques that can be used by the sportsman, including jumps and various stunts, slalom, and speed; of course, to correctly perform each one of these techniques, the user must assume a preferred body posture that has a given angle with respect to the longitudinal axis of the board, depending on the technique.

US-5,028,068 discloses a device for selectively and pivotally positioning a ski binding on a snowboard, wherein a first plate that supports the boot is arranged above a second circular plate that is perimetrically provided with a groove. The second circular plate is rotatably connected to a third plate that is in turn rigidly connected to the board. The second circular plate has, at the groove, a cord that surrounds it and can be tensioned by means of a lever. The actuation of the lever allows the engagement and/or disengagement of the cord with respect to the second circular plate, allowing the user to vary the angular position of the binding with respect to the longitudinal axis of the board.

This solution, however, has drawbacks: during the practice of slalom, jumps, and stunts, the binding and therefore the board are subjected to a very large number of torsional stresses that may not be contrasted effectively by the tension of the cord on the second circular plate. In particular at the moment of impact with the snow after a jump, the binding is subjected to a sudden and very intense torsional stress that can hardly be contrasted by the friction that occurs between the two smooth surfaces of the first plate and of the second plate.

Furthermore, the lever for tensioning the cord is distant and spaced from the binding; this lever can therefore easily disengage due to its accidental impacts against rocks or other objects or due to the snow.

A part of the cord is also exposed to possible accidental impacts, and the cord can be torn or be weakened, thus compromising the use of the binding.

In such cases, the user would lose control of the board, which would be difficult to steer. Finally, snow or water can deposit between the cord and the second circular plate, further reducing the friction between the two smooth surfaces of the first plate and of the second plate and accordingly the overall locking force of the lever.

All this is to the detriment of the user, who due to the possible lack of rigid coupling of the binding to the board, may suffer severe problems involving the legs in case of a fall.

US-5,044,654 discloses a binding that can be rotated about its own vertical axis; six appropriately spaced holes are formed thereon to accommodate a corresponding number of screws that are adapted to fix it to the board in a desired angular position that is preset by the user. The angular position can be changed by unscrewing the screws and repositioning them so that the binding is rotated by the desired angle.

The binding also includes a safety for the quick release of the boot from the board that is composed essentially of a hub on which appropriately shaped seats are provided perimetrically to accommodate a ball, said accommodation being forced by means of a spring.

However, this solution has drawbacks: in order to vary the angular position of the binding with respect to the snowboard, the user must remove his foot from the binding, and by means of an appropriate tool, unscrew the fixing screws, reposition the binding in the desired position, and perform a new coupling of said binding to the board.

The above-described operations, however, require considerable time, forcing the user to always have at least one tool available.

Furthermore, due to the scarce care paid by the user to these operations owing to his eagerness to be on the slopes, imprecise fixing of the screws to the board may be achieved, with consequent dangers of separations or of poor control of the board during sports practice.

It is also known to use a snowboard binding that is fixed to the board by means of a disk that is rigidly connected to the board by means of screws.

Inclined planes protrude below said disk, toward the board, and are arranged perimetrically; they interact with complementarily shaped planes that are formed at an adapted seat for containing the disk that is formed on the binding.

By appropriately tightening the screws, the disk moves toward the board until its inclined planes interact with the complementarily shaped planes formed on the binding, thus locking the disk and the binding to the board in a desired position.

It is known to replace the inclined planes with pairs of sets of teeth that are also inclined and are arranged on the disk and on the binding.

In this manner, the engagement and disengagement of the screws allow the disk to rise until the sets of teeth are mutually disengaged, although the disk remains connected to the board.

By rising, the disk allows to turn the binding, which can be arranged in the desired angular position.

It is thus possible to obtain a range of mutually diversified positions whose number is limited, however, by the size of the teeth that constitute the pairs of sets of teeth.

WO-A-93/14835 discloses a snowboard binding system having a binding plate including a circular opening which receives a hold-down plate. The hold-down plate may be secured to the snowboard in several different positions with the binding plate assuming a number of different rotational positions with respect to the hold-down plate.

This conventional binding, however, has other drawbacks; the user must remove his gloves, remove

his foot from the binding, be equipped with a screwdriver or with an appropriate wrench to disengage the screws, turn the binding with his hands into the position proximate to the desired one, and tighten the whole assembly.

This operation is excessively long and troublesome to be performed directly on the slope in order to modify the angular position according to the specific requirements.

A further solution that is used is known as "baseless", and includes a binding that is constituted by two separate half-shells that are mutually connected by a rear strap. Each half-shell is fixed to the board by means of screws accommodated in adapted slots formed on the flat part of said half-shells.

This conventional binding has the drawback that its angular adjustment is limited by the dimensions of the slots.

The aim of the present invention is therefore to eliminate the drawbacks described above in conventional types by providing a device that allows to easily and quickly perform the angular adjustment of the binding, with respect to the longitudinal axis of the board, said adjustment being executable directly during sports practice.

Within the scope of the above aim, an object is to provide a device that ensures the locking of the binding to the board during the adjustment operation, increasing safety for the user.

Another object is to provide a device of negligible bulk and weight which do not affect the user while performing the sports practices.

Another important object is to provide a device that can be adjusted by the user without using particular tools.

Another object is to provide a device that is reliable and safe in use and can be produced with low costs by conventional machines and equipment.

This aim, these objects, and others which will become apparent hereinafter are achieved by a snowboard adjustable binding comprising a disk connected to a supporting base for a shoe, said disk being associated with said snowboard, characterized in that it comprises means for selectively and continuously adjusting the angular position of said supporting base relative to said disk.

Further characteristics and advantages of the invention will become apparent from the detailed description of a particular embodiment, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a perspective view of a first embodiment of the binding;
figure 2 is a partial sectional view of the board, of the base, and of the disk;
figure 3 is a perspective view of a second embodiment of the binding;
figure 4 is a top view of the invention of figure 3;
figure 5 is a sectional view, taken along the plane V-V of figure 1;
figure 6 is a view of a detail of figure 5;
figure 7 is a perspective view of a third embodiment of the binding;
figure 8 is a perspective view of an additional element for visualizing the position angle.

With reference to the above figures, the reference numeral 1 designates a snowboard binding that comprises a base 2 for supporting a shoe.

Base 2 is preferably U-shaped in plan view and is constituted by a first wing 3a and by a second wing 3b that are flexible and between which a longitudinal opening 4 is formed.

A first lateral shoulder and a second lateral shoulder, designated by the reference numerals 5a and 5b, protrude at right angles from base 2, on the outside of first wing 3a and of second wing 3b.

Base 2 has a preferably rounded shape at the first front region 6a and at the second rear region 6b.

A first seat 7a and a second seat 7b are formed transversely in first wing 3a and in second wing 3b, proximate to second region 6b, and both have a circular cross-section and have the same axis. First seat 7a affects the entire width of first wing 3a.

Advantageously, the length of second seat 7b is shorter than the width of second wing 3b.

A first recess 8a and a second recess 8b are formed respectively in first wing 3a and in second wing 3b, at opening 4. The recesses are arc-shaped, in plan view, and are mirror-symmetrical with respect to a median plane that lies longitudinally relative to plate 2 and are arranged in an intermediate position between first region 6a and second region 6b.

First recess 8a and second recess 8b have a preferably L-shaped profile that is constituted by a first secondary wing 9a and by a second secondary wing 9b that are arranged so as to face each other above snowboard 30.

First recess 8a and second recess 8b form a seat for a disk 10 that is rigidly fixed to snowboard 30; this fixing preferably occurs by means of screws that can be inserted at adapted holes, designated by the reference numeral 11, that are formed on disk 10.

Disk 10 has an edge 12 that is shaped complementarily to first recess 8a and to second recess 8b. A hollow 13 that is shaped complementarily to the first and second secondary wings 9a and 9b is in fact formed in edge 12 in a downward region.

The adjustment device has selective angular adjustment means that are constituted by first grip means 14 that interact with second engagement means 15.

First grip means 14 are constituted by a first set of teeth that is formed at edge 12 of disk 10 and by a second set of teeth that is shaped complementarily to the first one and is formed at first recess 8a and at second recess 8b.

Second engagement means 15 are constituted by a pivot 16 that has a threaded end part 17 that is accommodated at second complementarily threaded seat 7b. The remaining part of the pivot is freely accommodated at first seat 7a and protrudes externally with respect to first wing 3a, where pivot 16 is connected to an eccentric lever 18 that is adjacent to, and interacts with, first lateral shoulder 5a.

Preferably, eccentric lever 18 has an arm 19 that is directed toward first region 6a.

Advantageously, it is possible to add an element 20, by arranging it so that it is rigidly coupled below disk 10. Element 20 has a circular plan shape which has a peripheral region 20a on which notches 21 are formed that are adapted to allow the user to identify the rotation angle of base 2 with respect to disk 10.

The operation of the device is as follows: once disk 10 has been inserted between first recess 8a and second recess 8b and rigidly coupled to board 30 together with base 2, first wing 2a and second wing 3b, which are flexible, are slightly spaced apart and have a mutual distance that is slightly greater than the diameter of disk 10.

Once end part 17 of pivot 16 has been screwed at second seat 7b, it is possible to adjust the locking action between edge 12 of disk 10 and first recess 8a and second recess 8b. Finally, the locking of eccentric lever 18 allows to rigidly couple the base and disk 10 to each other.

In order to turn base 2 with respect to fixed disk 10, eccentric lever 16 is opened, so as to allow first wing 3a and second wing 3b to disengage from disk 10. Then, by turning the user's foot, base 2 also turns until it reaches the desired angular position, and the entire assembly is then locked by closing eccentric lever 18.

It has been observed that the device has achieved the intended aim and objects, allowing an easy angular adjustment of the binding, with respect to the longitudinal axis of the board, directly during sports practice, because the lever is arranged outside the base and can be actuated by the user without removing his/her foot from the binding and therefore even during sports practice.

Furthermore, the presence of the first set of teeth and of the second set of teeth allows to ensure the locking of the binding to the board, increasing the user's safety, avoiding any problem due to sudden stresses or to the interposition of snow and/or water between the disk and the base.

The device also has a bulk and weight that are negligible for the user and is adjustable without using particular tools.

The device is of course susceptible of numerous modifications and variations, all of which are within the scope of the same inventive concept.

Thus, for example, figures 3, 5, and 6 illustrate a snowboard binding 101 that comprises a shoe supporting base 102 that has a rod-like spatial structure.

Base 102 has a structure that is composed of a single part or can be advantageously composed of a plurality of parts connected to each other.

Base 102 has a lateral support 131 for the shoe that is preferably U-shaped and is made of a flexible material.

A first rod-like wing 103a and a second rod-like wing 103b are associated with support 131 of base 102 in a downward region and are appropriately shaped and arranged in a mirror-symmetrical fashion with respect to a median plane that lies longitudinally to base 102.

First rod-like wing 103a and second rod-like wing 103b are shaped, at one of their median regions, so as to form a first arc 108a and a second arc 108b that are mirror-symmetrical with respect to a median plane that lies longitudinally with respect to plate 102 and are adapted to accommodate a disk 110.

First arc 108a and second arc 108b have a preferably L-shaped profile, forming a seat between them for the complementarily shaped disk 110 that is rigidly fixed to a snowboard 130.

The device has means for the selective angular adjustment of the base with respect to the disk which are constituted by first grip means 114 that interact with second engagement means 115.

First grip means 114 are constituted by a first set of teeth 132 that is formed at edge 112 of disk 110 and by a second set of teeth 133 that is shaped complementarily to the first one and is formed at the facing surfaces of first arc 108a and of second arc 108b.

Second engagement means 115 are constituted by a pivot 116 that has oppositely arranged threads and which with a grip element, such as a nut 122a or a knob 122b, is rigidly coupled approximately in a median region.

Pivot 116 can be inserted in a complementarily threaded first seat 107a and in a second seat 107b that have the same axis and are formed transversely to first wing 103a and to second wing 103b to the rear of disk 110.

On the opposite side with respect to pivot 116, in a region that is adjacent to disk 110, there is a strap 123 that is adapted to maintain a fixed distance between first rod-like wing 103a and second rod-like wing 103b in that point.

The operation is as follows: by turning grip element 122, first rod-like wing 107a and second rod-like wing 107b move mutually apart or mutually closer, thus allowing to lock disk 110 between first arc 108a and second arc 108b.

Since grip element 122 is arranged laterally with respect to the foot of the user, during the sports practice said element can be operated by the user without removing the boot from base 102.

This solution, too, allows to achieve the intended aim and objects.

Another solution is shown in figure 7, in which the reference numeral 201 designates a binding for a snowboard that comprises a flat base 202 for supporting a shoe.

Base 202 is preferably U-shaped in plan view, so as to form a first wing 203a and a second wing 203b that are flexible and between which a longitudinal opening 204 is formed.

Base 202 has a preferably rounded shape at the first front region 206a and at the second rear region 206b.

A rod-like flexible structure 224 is associated with base 202 and has a U-shaped support 231 whose free ends are connected to base 202 proximate to first region 206a. The support is connected, proximate to second region 206b of base 202, to the tips of a rod 225 that is appropriately U-shaped; the connecting part 234 between said ends is rotatably pivoted at a pair of sleeves 235a and 235b that are rigidly coupled and protrude at the free ends of first wing 203a and of second wing 203b.

A first internally hollow seat 207a and a second internally threaded seat 207b are formed transversely in first wing 203a and in second wing 203b, proximate to second region 206b. Both have a circular cross-section, have the same axis, and are adapted to allow the connection of second engagement means 215 that are constituted by a pivot 216.

Second engagement means 215 are constituted by a pivot 216 that has a threaded end part 217 that is accommodated at second complementarily threaded seat 207b. The remaining part of the pivot is freely accommodated at first seat 207a and protrudes outside first wing 203a; there, pivot 216 is connected to an eccentric lever 218 that is adjacent to, and interacts with, the outer edge of first wing 203a.

Preferably, eccentric lever 218 has an arm 219 that is directed toward first region 206a.

A first recess 208a and a second recess 208b are formed in first wing 203a and in second wing 203b, and have the shape of a circular arc in plan view. Recesses 208a, 208b are mirror-symmetrical with respect to a median plane that lies longitudinally to plate 202, and are arranged in an intermediate position between first region 206a and second region 206b.

First recess 208a and second recess 208b have a preferably L-shaped profile on which a first set of teeth is formed. First recess 208a and second recess 208b form a seat, between them, for a disk 210 that is rigidly fixed to a snowboard.

Disk 210 has an edge 212 that comprises a second set of teeth that is shaped complementarily to the first set of teeth.

This solution, too, achieves the intended aim and objects.

The materials and the dimensions that constitute the individual components of the device may of course also be the most appropriate according to the specific requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A snowboard adjustable binding comprising a disk (10,110,210) connected to a supporting base (2,102,202) for a shoe, said disk being associated with said snowboard, characterized in that it comprises means (15,115,215) for selectively and continuously adjusting the angular position of said supporting base relative to said disk.

2. The binding according to claim 1, characterized in that said supporting base (2,102,202) comprises at least two elastically deformable portions (8a,8b,108a,108b,208a,208b) engaging said disk (10,110,210), said means comprising a lock/release member (15,115,215) adapted to lock said portions on said disk, in order to lock said base in a selected angular position, and to release said portions from said disk, in order to rotate said base to a different angular position.

3. The binding according to claim 1, characterized in that said base is U-shaped in plan view, so as to form a first wing (3a) and a second wing (3b) that are flexible, a longitudinal opening (4) being formed between said first and second wings, a first lateral shoulder (5a) and a second lateral shoulder (5b) protruding on the outside of said first and second wings and at right angles to said base.

4. Device according to claim 3, characterized in that said base has a rounded shape at the first front region (6a) and at the second rear region (6b), a first seat (7a) and a second seat (7b) being formed transversely in said first and second wing proximate to said second region, both seats having a circular cross-section and having the same axis, said first seat affecting the entire width of said first wing, said second seat being shorter than said second wing is wide.

5. Device according to claim 4, characterized in that a first recess (8a) and a second recess (8b) are formed at said opening respectively in said first wing and in said second wing, said recesses having the shape of a circular arc in plan view, and being arranged in a mirror-symmetrical manner with respect to a median plane that lies longitudinally to said plate, and are arranged in an intermediate position between said first region and said second region.

6. Device according to claim 5, characterized in that said first and second recesses have an L-shaped profile that is constituted by a first secondary wing

(9a) and by a second secondary wing (9b) that are arranged so as to face each other above said snowboard.

7. Device according to claim 6, characterized in that said first and second recesses form a seat for said disk (10) that is rigidly fixed to said snowboard (30) by means of screws that can be inserted at adapted holes (11).

8. Device according to claim 7, characterized in that said disk (10) has an edge (12) that is shaped complementarily to said first and second recesses (8a,8b), a hollow (13) that is shaped complementarily to said first and second secondary wings being formed in a downward region in said edge.

9. Device according to one or more of the preceding claims, characterized in that said means comprises a first grip means (14) that interact with second engagement means (15), said first grip means being constituted by a first set of teeth, formed at said edge (12) of said disk, and by a second set of teeth, which is shaped complementarily to said first set of teeth and is formed at said first and second recesses (8a,8b).

10. Device according to claim 9, characterized in that said second engagement means comprises a pivot (16) that has a threaded end part (17) that is accommodated at said complementarily threaded second seat, the remaining part of said pivot being freely accommodated at said first seat and protruding outside said first wing, said pivot being rotatably connected thereat to an eccentric lever (18) that interacts with said first lateral shoulder or said edge of said first wing.

11. Device according to claim 10, characterized in that said eccentric lever (18) has an arm (19) that is directed toward said first region (6a).

12. Device according to one or more of the preceding claims, characterized in that an element (20) having circular plan shape is arranged above said disk and has a peripheral region (20a) on which notches (21) are formed that are adapted to allow the user to recognize the rotation angle of said base with respect to said disk.

13. Device according to one or more of the preceding claims, characterized in that the locking of said lever (18) locks said first and second wings (3a,3b) on the edge of said disk (10).

14. Device according to one or more of the preceding claims, characterized in that said base (102) has a rod-like spatial structure having a lateral support (131), for said shoe, said lateral support being U-shaped and made of a flexible material, a first rod-like wing (103a) and a second rod-like wing (103b) being associated with said support in a downward region, said rod-like wings being arranged in an approximately mirror-symmetrical manner with respect to a median plane that lies longitudinally to said base.

15. Device according to claim 14, characterized in that said first and second rod-like wings (103a,103b) are shaped, at one of their median regions, so as to form a first arc (108a) and a second arc (108b) that are approximately mirror-symmetrical with respect to a median plane that lies longitudinally to said plate and are suitable to accommodate said disk (110).

16. Device according to claim 15, characterized in that said first and second arcs (108a, 108b) have an L-shaped profile, forming between them a seat for said complementarily shaped disk (110).

17. Device according to claim 16, characterized in that said selective angular adjustment means are constituted by first grip means (114) that interact with second engagement means (115), said first grip means being constituted by a first set of teeth (132) that is formed at said edge (112) of said disk (110) and by a second set of teeth (133) that is shaped complementarily to said first set of teeth, said sets of teeth being formed at the facing surfaces of said first and second arcs.

18. Device according to claim 17, characterized in that said second engagement means (115) are constituted by a pivot (116) that has oppositely arranged threads, a grip element such as a nut (122a) being rigidly coupled to said pivot approximately in a median region or a knob (122b) being rigidly coupled to said pivot at one end, said pivot being insertable in a complementarily threaded first seat (107a) and in a second seat (107b), said seats having the same axis and being formed transversely to said first and second wings to the rear of said disk.

19. Device according to claim 18, characterized in that on the opposite side with respect to said pivot (116), in a region that is adjacent to said disk (110), there is a strap (123) that is adapted to maintain a fixed distance between said first rod-like wing (103a) and said second rod-like wing (103b) in that point.

20. Device according to one or more of the preceding claims, characterized in that a rod-like flexible structure (224) is associated with a base (202) and has a U-shaped support (231) whose free ends are connected to said base proximate to a first region (206a) of said base (202); said support being con-

nected, proximate to a second region (206b) of said base (202), to the tips of a rod (225) that is U-shaped and whose connecting portion (234) between said tips is rotatably pivoted at a pair of sleeves (235a,235b) that protrude at the free ends of first and second wings (203a,203b) of said base (202).

21. Device according to claim 20, characterized in that a first internally hollow seat (207a) and a second internally threaded seat (207b) are formed transversely in said first wing (203a) and in said second wing (203b), proximate to said second region (206b), both seats having a circular cross-section, having the same axis, and being adapted to allow the connection of second engagement means (215) constituted by a pivot (216).

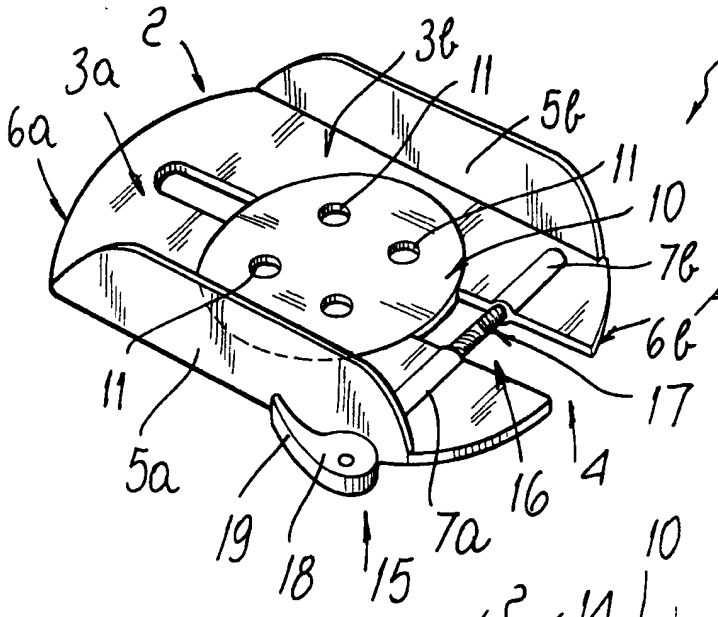

Fig. 1

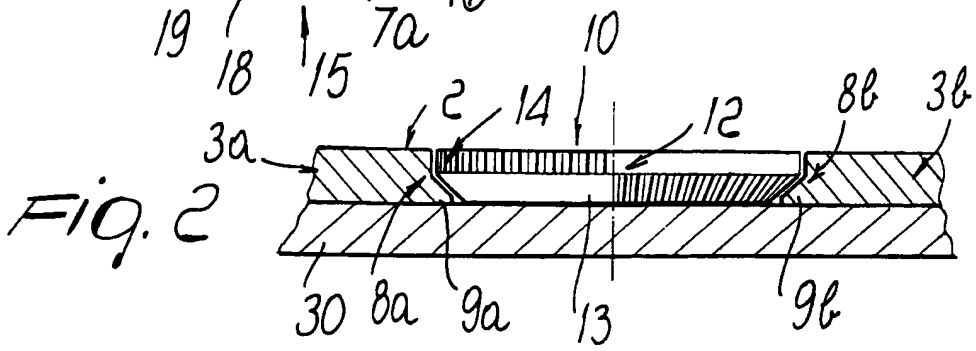

Fig. 2

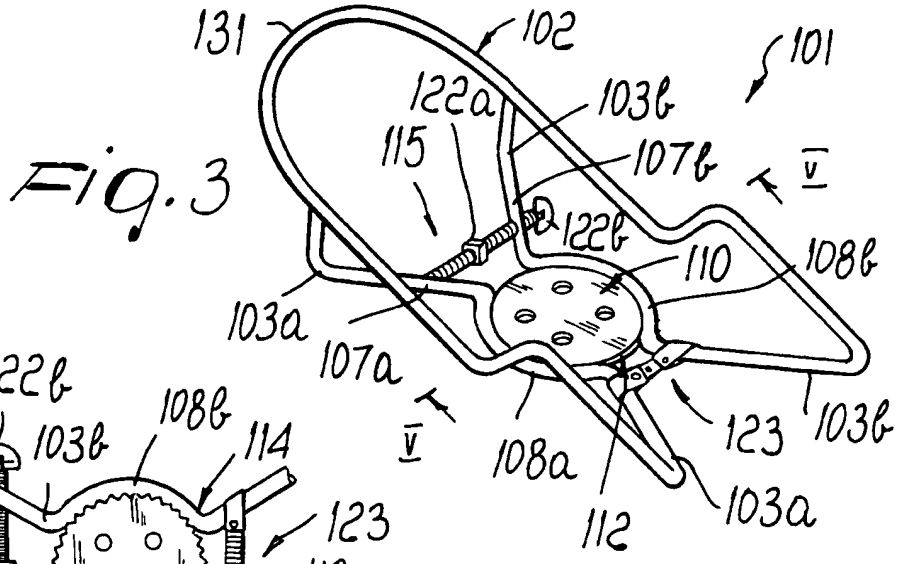

Fig. 3

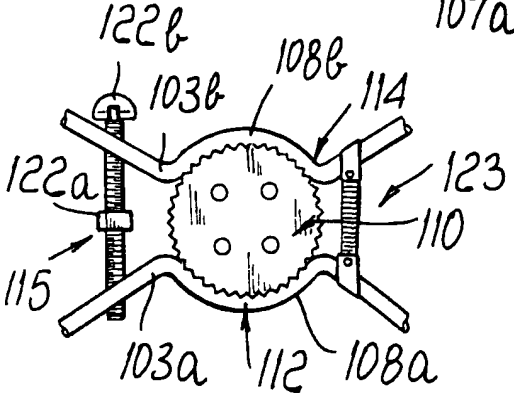

Fig. 4

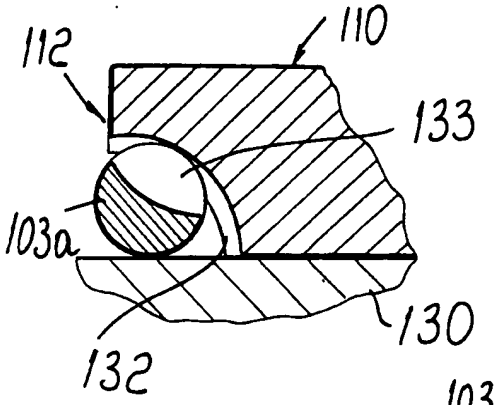

Fig. 6

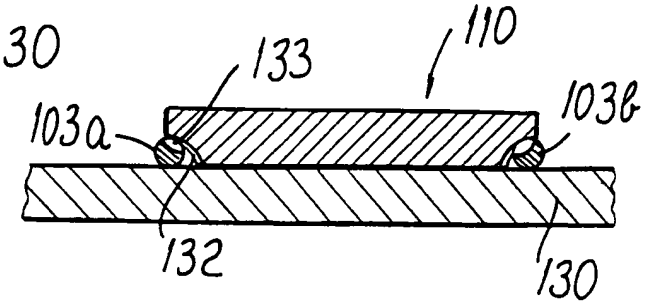

Fig. 5

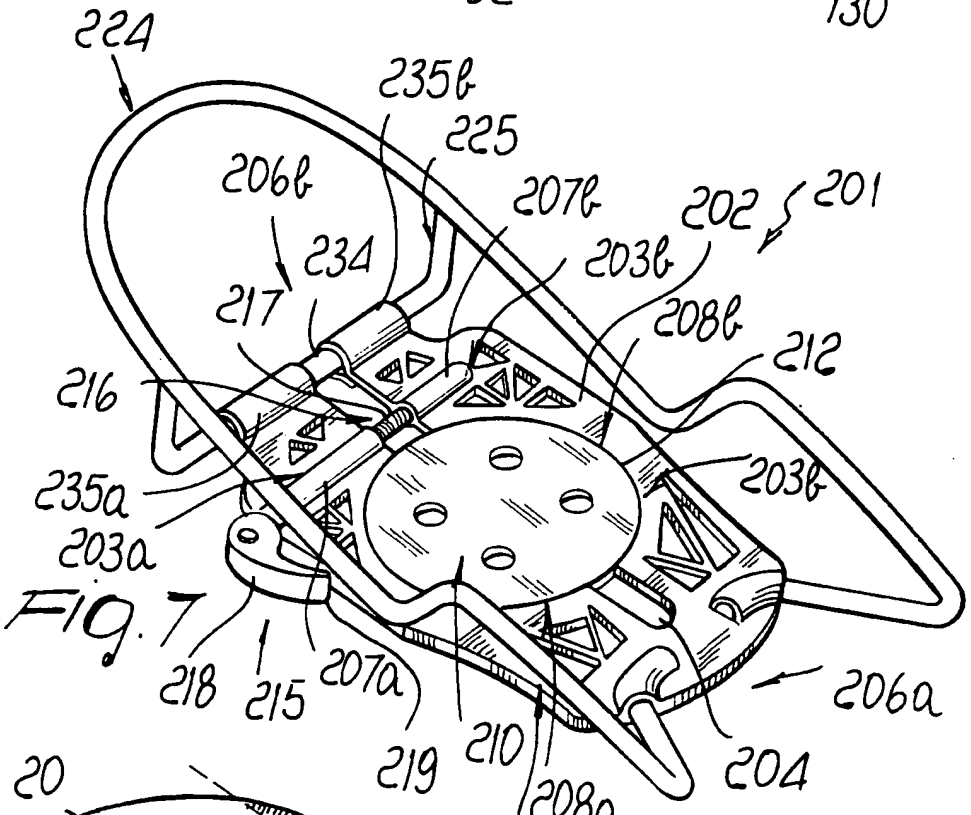

Fig. 7

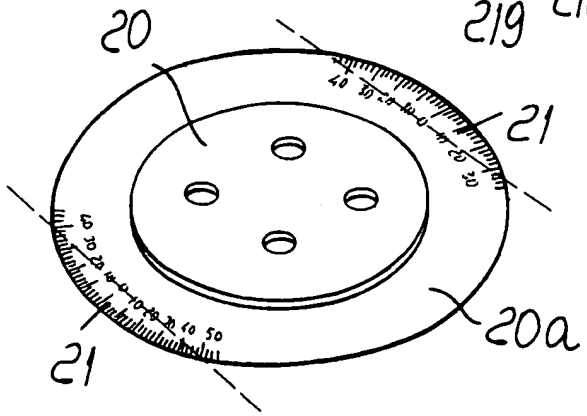

Fig. 8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 11 2207

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,X A	WO-A-93 14835 (THE BURTON CORP.) * page 4, paragraph 1 - paragraph 4; figures 2,4 *	1,7,8 2,3,5,6, 9,15,17	A63C9/08
A	FR-A-2 627 097 (DURET) * page 5, line 24 - page 6, line 21; figures 2-6,8 *	1-3,8	
A	EP-A-0 398 794 (CHABILAND) * column 6, paragraph 3; figures 1,2 *	1,9	
A	EP-A-0 285 558 (NÄPFLIN) * figures 2,3 *	1,2,14, 20	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) A63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 November 1996	Steegman, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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